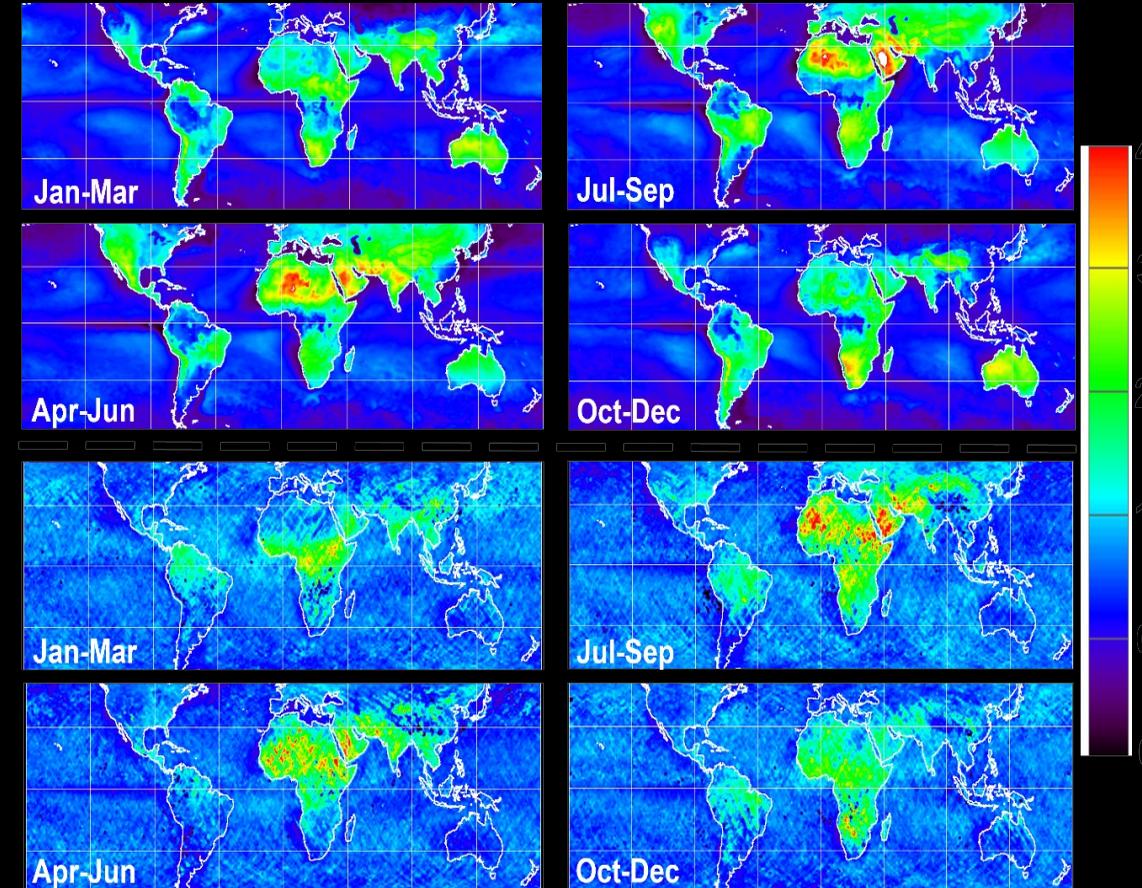


# Global Planetary Boundary Layer Height Retrieval from ICESat-2 and CATS

- GSFC scientists have now shown that **satellite lidar is a viable technique** for obtaining global Planetary Boundary Layer (PBL) height estimates.
- The PBL is where ALL physical interactions with the surface – such as **heat and moisture transport, pollution dispersion and transport** – take place.
- PBL height has been identified as a **Decadal Survey priority**. Having global satellite PBL height measurements will greatly benefit **air quality forecasts, weather prediction, and climate modeling**.
- Accurate **PBL heights has been difficult to discern**; radiosondes have extremely limited coverage, and MERRA-2 re-analysis is weaker over oceans.
- GSFC scientists trained a **machine learning algorithm** to use lidar data and more accurately estimate PBL height at global scale.
- Lidar signal is largely a function of the number of particles per volume. Because aerosols and other particles are significantly higher in the PBL, the lidar signal is higher as well. **Lidar-retrieved PBL height agrees well** with radiosonde and has a high degree of spatial correlation with the MERRA-2 heights.



Top 4 plots: MERRA-2 seasonal PBL height at 14:00 local time between 51S and 51N latitude. Bottom 4 plots: CATS average seasonal PBL height, **from lidar data and ML algorithm**